

Abstract of the Invention

Measurement in the frequency range 3 mHz–106 Hz of the dielectric characteristics of emeraldine base polyaniline dissolved in 1-methyl-2-pyrrolidinone (NMP) and cast into bulk free-standing polymer films shows features similar to those reported by others and which are a result of microphase separation into reduced and oxidized repeat units. However, upon confinement into the cylindrical pores, of average diameter 20 nm, of a porous membrane such features of microphase separation do not occur. The microphase separation observed in the bulk polymer is suppressed by strong pinning of the charge carriers due to interactions of the polymer with pore walls together with constrained chain packing and a non-uniform rate of evaporation of the NMP solvent from the pores. This enhances the bulk conductivity after doping by reducing the internal intra-chain disorder introduced by microphase separation.